

REMARKS/ARGUMENTS

Claims 1-3 and 5-33 are pending, with claims 21-33 being withdrawn from consideration.

Claim 1 is amended to specify that the liquid is moved continuously and that the particles are separated by the combined exertion of the deflecting potential and the at least one focusing potential during the continuous moving of the liquid. Support for this amendment is apparent in the original disclosure at, e.g., page 6, lines 17-20 and page 7, lines 19-24. No new matter is added.

Claim Rejections – 35 U.S.C. § 103

Claims 1-3, 6-17 and 19-20 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over US 5454472 (Benecke). Claim 5 stands rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Benecke as further evidenced by US 6783647 (Culbertson). Claim 18 stands rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Benecke in view of US 20010023825 (Frumin). These rejections are respectfully traversed.

Benecke Fails to Disclose or Suggest All Claim Limitations

Benecke discloses two distinct embodiments, which are summarized in the passage of column 1 (line 63) to column 2 (line 10) and further specified in figure 1 (embodiment a) and figure 3 (embodiment b).

In embodiment a, high-frequency fields are used for moving all particles but not for separating them. There is no liquid flow for moving the particles.

In embodiment b, the particles are moved by the flow of the suspension medium along electrodes (shown in figure 3) creating field inhomogeneities. Under the influence of high-frequency voltages, dielectrophoretic forces are applied to the particles, which can be separated from each other depending on the dielectric properties thereof.

Neither embodiment of Benecke separates the particles in a continuously moving liquid by the combined exertion of a deflecting potential and at least one focusing potential. This feature of Applicants' claimed invention results in the particles moving towards two different flow regions within the liquid flow in the channel (see Figs. 1-3 of the instant application). Thus, unlike the methods of Benecke, Applicants' claimed separation occurs within the flowing liquid (i.e., without an out-coupling out of the moving liquid), which represents an essential advantage compared with conventional techniques, particularly with respect to microfluidic techniques

wherein a continuous flow even with different particle fractions is highly desirable.

As a further advantage, using two different separating potentials allows an adjustment and adaptation of the separation effect to the particles to be separated (present description, page 6, paragraph 2, to page 7, paragraph 1).

Secondary References do not Remedy the Deficiencies of Benecke

Culbertson is cited as teaching that it is well known in the art to conduct cell lysis under applied electric fields, clearly failing to remedy the aforementioned deficiencies of the primary reference, Benecke, with respect to the claimed invention.

Frumin at Paragraph 0275 discloses that electrophoretic and dielectrophoretic forces can be combined to create “virtual traps” which “appear at points along the channel where the total velocity due to electrophoretic and dielectrophoretic forces acting on a specific fraction is equal [to] zero.” Frumin at Paragraph 0276 discloses that these virtual traps enable “the accumulation and focussing of specific fractions in preset locations along the separation channel for the fast detection and extraction.” Paragraph 0274 does not speak to separating particles in different flow paths.

Thus, Culbertson and Frumin do not disclose any features which properly combine with the teachings of Benecke to lead to the present invention.

Accordingly, reconsideration and withdrawal of the obviousness rejections are respectfully requested.

For at least the reasons set forth above, it is respectfully submitted that the above-identified application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are respectfully requested.

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Should the Examiner believe that anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

CAESAR, RIVISE, BERNSTEIN,
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Please charge or credit our
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